**Long-Term Survival After Repair of Proximal Abdominal Aortic Aneurysms**

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**Objectives:** To review our 26-year clinical experience with open proximal abdominal aortic aneurysm (AAA) repair, with a focus on long-term survival.

**Methods:** A retrospective cohort study was performed of all patients who underwent proximal AAA repair between 1985 and 2011 at a tertiary care referral center. Demographics, operative variables, and early and late complications, as well as 30-day mortality, were analyzed. Mid- and long-term survival was assessed through review of the electronic medical records and the Social Security Death Index. The Kaplan-Meier method was used to calculate patient survival. Univariate Cox regression and hazard ratio (HR) estimates were used to test for associations between demographic variables, complication variables, and survival to determine predictors of adverse outcomes.

**Results:** Two hundred forty patients were identified. Mean age was 76 years (range, 38-92 years). Seventy percent were male, and 90% were Caucasian. Aneurysm type was juxtarenal in 124 (55%) patients, suprarenal in 66 (25%) patients, and type IV thoracoabdominal in 50 (20%) patients. Thirty-day mortality was 3% (eight patients), and in-hospital mortality was 4% (nine patients). At least one major complication occurred in 49% of the patients, which included: acute renal dysfunction (increase Cr >0.5 mg/dL from baseline), 40%; hemodialysis at discharge, 1.6%; myocardial infarction, 3%; pulmonary complication, 23%; paraplegia, 0.5%; and visceral ischemia, 1.7%. Median follow-up was 54 months. Late complications included one graft infection and one limb occlusion. Kaplan-Meier survival estimates were 70% at 5 years, and 43% at 10 years. Variables associated with poorer survival included: congestive heart failure (HR, 3.6; $P < .001$), chronic obstructive pulmonary disease (HR, 1.6; $P < .012$), history of aortic dissection (HR, 7.997; $P < .046$), current tobacco use (HR, 1.5; $P = .048$), and increasing aneurysm size (HR, 1.1; $P < .005$).

**Conclusions:** Open surgical repair of proximal AAA can be performed with low mortality. Temporary renal insufficiency is the most frequent complication, but the need for permanent hemodialysis is low. Late complications are rare, and long-term survival is favorable. This data should assist in establishing a benchmark for endovascular repair of these complex aneurysms.

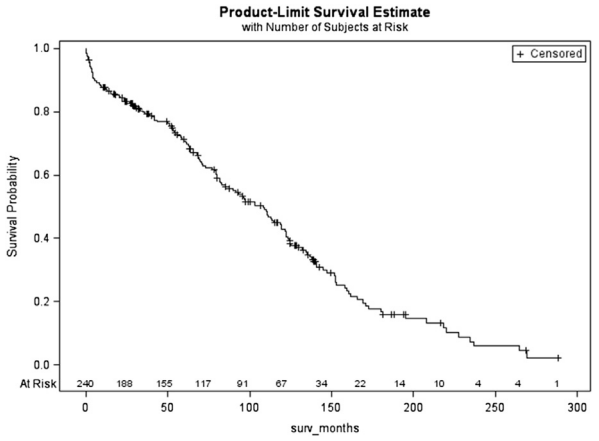


**Fig.**

**Endovascular Intervention for Pelvic Congestion Syndrome Is Justified for Chronic Pelvic Pain Relief and Patient Satisfaction**

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**Objectives:** Pelvic congestion syndrome (PCS) is difficult to diagnose, poorly understood, and often confused with other causes of chronic pelvic pain. Thus, gonadal vein reflux, its relation to lower extremity venous insufficiency (LEVI), and treatment remains controversial to physicians and payors. We present our experience with endovascular PCS treatment and hypothesize that properly selected patients can realize significant improvement.

**Methods:** A retrospective study of patients treated for PCS at our institution from 2008 to 2012 was performed. Diagnosis was made clinically by presence of pelvic pain, dyspareunia, and/or perineal varicosities. Clinical parameters, procedural details, and follow-up were reviewed. A questionnaire including a Visual Analog Scale was sent to patients (Fig).

**Results:** Diagnosis was made in 15 women (mean age, 36 years; mean parity, 2). All had pelvic pain, six had dyspareunia, 14 had perineal varicosities, and 10 had concomitant LEVI. Fourteen had gonadal vein reflux (mean diameter, 7.4 mm) and pelvic varicosities at angiography and had coiling (12) and/or Amplatzer plug (4). One patient had stenting of a stenotic left common iliac vein. All patients with concomitant LEVI had successful appropriate treatment. Eight patients completed the questionnaire at a mean follow-up of 4 years. Mean pelvic pain score went from 9.375 to 1.875 postprocedure ($P < .0001$ Student *t*-test). Mean dyspareunia score went from 8.875 to 1.5 ($P < .0001$). Mean perineal varicosity pain score went from 9.285 to 1.285 ($P < .0001$). Two patients had recurrence with a mean pelvic pain score of 4.5 at a mean 21 months. On a five-point Likert scale, all patients were satisfied (1) or extremely satisfied (7) with treatment.

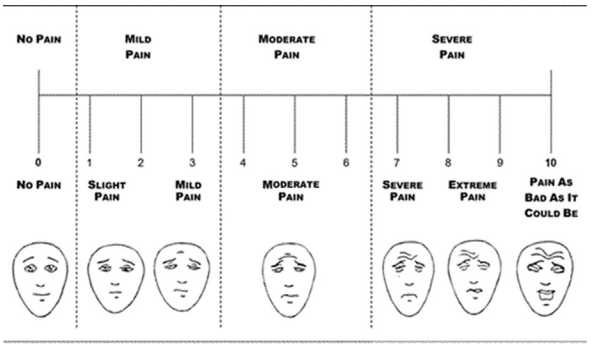


**Fig.**

**Conclusions:** Endovascular PCS treatment offers excellent pelvic pain relief and patient satisfaction. Women with pelvic pain, dyspareunia, or perineal varicosities with gonadal vein reflux and pelvic varicosities or iliac vein stenosis should not be denied treatment. A significant number may have concomitant LEVI and should be screened accordingly.

**Penetration of the Inferior Vena Cava and Adjacent Organs After Filter Placement Is Common and Associated with Temporary Filter Type and Length of Time in Place**

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**Objectives:** Concern over local complications of inferior vena cava (IVC) filters exists, but little long-term data is available. Referrals for filter penetration on computed tomography (CT) have increased with no standards for management. We reviewed post-filter CT findings in our institution.

**Methods:** All patients receiving IVC filters between January 1, 2006 and December 31, 2009 with a post-filter CT were reviewed. Penetration was graded using a modified previously published scale (Table). Filter indication, type, and subsequent encounters for abdominal or back pain were recorded.

**Results:** A total of 591 patients had a filter implanted during the study period. Of these, 262 had an adequate post-filter CT, comprising the study group. Indications for filter were prophylaxis in 16.4% and venous thromboembolism in 83.6%. Of filters placed for venous thromboembolism, indications were absolute (inability/failure of anticoagulation) in 44.7% and relative in 55.3%. A total of 92.7% were temporary; 7.3% were permanent type. Of temporary filters, 1.6% were retrieved. Mean time from filter placement to most recent CT was 406 days. One hundred twenty (45.8%) filters had grade 2 or 3 penetration. A total of 4.6% (12) had aortic penetration, 9.9% (26) had duodenal penetration, and 2.3% (6) had spine, colon, or kidney penetration; seven patients had simultaneous penetration of two

organs. Another 38.2% (100) had struts immediately adjacent to the external aspect of the IVC, which may represent tenting of the cava. Grade 2 or 3 penetration occurred in 74.4% of Celects, 44.6% of Tulips, 5.3% of Greenfields, and 0% of Opteases ($P = .0000$). Grade 2 or 3 penetration occurred in 49.0% of temporary filters but only 5.3% of permanent filters ($P = .0001$). There was a trend toward association of uniconical filters with grade 2 or 3 penetration ($P = .0645$). Grade 2 or 3 penetration occurred in 18.2% of filters less than 30 days old but in 57.3% of filters 30 days old or older ($P < .0001$). Thirty-two patients had subsequent encounters for abdominal or back pain, but none were conclusively related to penetration.

**Conclusions:** A majority of filters were placed for prophylaxis or relative indications and were temporary type. Retrieval rate is low. Penetration of the IVC and adjacent organs is common and associated with temporary type and length of time in place. It is unclear if most penetrations cause problems. Monitoring of penetrations with CT may be important to understand the natural history of this condition.

**Table.**

| *CT findings* | *Grade* |
|---|---|
| Struts confined entirely within IVC | 0 |
| Strut immediately adjacent to external aspect of IVC wall ("tenting") | 1 |
| Strut entirely outside IVC lumen ("halo" of retroperitoneal fat around strut) | 2 |
| Strut interacts with aorta | 3a |
| Strut interacts with duodenum | 3b |
| Strut interacts with other organs | 3c |

*CT,* Computed tomography; *IVC,* inferior vena cava.

**Thoracic Aortic Diameter Changes After Endograft Placement: Comparison of Traumatic and Aneurysmal Disease**

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**Objectives:** This study evaluates acute changes in aortic size before and after endograft placement for traumatic injury and aneurysmal disease. We hypothesized that characteristics specific to trauma patients undergoing thoracic endovascular aortic repair (TEVAR), such as hypovolemia or localized spasm around the aortic injury, may result in relative device undersizing.

**Methods:** This was a retrospective study that evaluated digital imaging of traumatic injury and aneurysmal patients enrolled in the 0802 and 0803 multi-site trials that received the GORE Conformable TAG thoracic device (W. L Gore and Associates, Flagstaff, Ariz). Pre- and posttreatment (30-day) imaging was available for 70 traumatic injury and 54 aneurysmal patients. A standardized protocol was used by an independent single observer to complete measurements of the proximal and distal maximum neck diameters adjacent to the pathology using the orthogonal view on pre- and posttreatment imaging. The resultant changes in diameter for each group were analyzed using *t*-tests. The study was limited by lack of intraprocedural imaging and clinical information on the selection of device sizing.

**Results:** There was significant difference between patients with traumatic and aneurysmal disease in the changes of the proximal and distal neck diameters from the pre- and posttreatment imaging. In traumatic injury patients, the proximal and distal maximum aortic neck diameters were found to increase after TEVAR significantly more than in patients with aneurysmal disease. The range that the neck diameters changed was greater for patients with traumatic injuries than with aneurysmal disease. In both study populations, smaller pretreatment aortic neck diameters showed a larger change in neck diameter than larger pretreatment aortic diameters. Aortic growth correlated with pretreatment neck diameter and oversizing.

**Conclusions:** The proximal and distal maximum aortic neck diameters in traumatic injury patients increased significantly more from the pre- and posttreatment imaging than in patients with aneurysmal disease. Pretreatment neck diameter and percent oversizing correlate with the change in the neck diameter. Despite these aortic changes, TEVAR with this device is effective over a wide sizing range.

**Table.**

| *Summary of analysis* | *Change in proximal neck diameter (mm) (mean, range, variance)* | | *Change in distal neck diameter (mm) (mean, range, variance)* | |
|---|---|---|---|---|
| Traumatic injury | 3.06 (−3.59 to 9.47) | 6.86 | 2.99 (−1.61 to 13.69) | 4.78 |
| Aneurysmal disease | 2.06 (−2.89 to 5.72) | 3.46 | 0.67 (−5.67 to 4.34) | 3.08 |
| *P* value (trauma vs aneurysm) | .019 | | <.001 | |

**Post-Approval Outcomes of Juxtarenal Aortic Aneurysms Treated with the Zenith Fenestrated Endovascular Graft**

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**Objectives:** To evaluate postapproval outcomes of patients with juxtarenal aortic aneurysms (JRAAs) treated with Zenith Fenestrated Endovascular Graft (zFEN).

**Methods:** We reviewed clinical data on consecutive patients treated with zFEN in the US at seven institutions with early commercial access from 7/12 to 12/12. Clinical outcomes and compliance to anatomical guidelines were compared with results of the US fenestrated trial (USFT).

**Results:** Fifty-seven patients were treated. There were significantly more ($P < .05$) patients with coronary artery disease, myocardial infarction, and preoperative renal insufficiency than in the USFT. Twenty-seven patients (47%) did not meet the USFT anatomic criteria of a >4 mm infrarenal neck, and there were significantly more mesenteric stents (13 vs 0; $P < .05$) used in this group than in the USFT, reflecting the higher anatomical complexity of these patients. The total operative time was 250.2 ± 14.8 minutes, fluoroscopy time was 68.9 ± 4.47 minutes, and the average contrast volume was 108.6 ± 5.6 mL. Technical success was 100% in regards to aneurysm exclusion, although in two patients the left renal fenestration was not able to be aligned, and one patient had a kinked renal stent that was successfully re-stented. During this time period, there were a total of 10 endoleaks of which two were type 3 and eight were type II (Table).

**Conclusions:** Despite higher rates of comorbidities and more challenging anatomy, early 30-day outcomes of JRAAs treated postapproval with zFEN compare well with USFT data.

**Table.**

| *Patient demographics and 30-day outcomes* | *Study patients* | *zFEN trial patients* | P *value* |
|---|---|---|---|
| No. | 57 | 42 | |
| Age, years | 73.3 | 75.3 | .76 |
| Coronary artery disease, n (%) | 45 (79) | 22 (52.4) | <.05 |
| Chronic obstructive pulmonary disease, n (%) | 21 (36.8) | 14 (33.3) | .83 |
| History of myocardial infarction, n (%) | 34 (59.6) | 10 (23.8) | <.05 |
| Technical success, n (%) | 57 (100) | 42 (100) | 1.00 |
| Mortality, n (%) | 1 (1.75) | 0 (0) | 1.00 |
| Postoperative dialysis, n (%) | 1 (1.75) | 0 (0) | 1.00 |
| Endoleak, n | 10 | 9 | .62 |

**Patient and Clinical Characteristics Associated with Readmission Among Patients Undergoing Vascular Surgery**

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